

UvA HPC Course

HPC CLOUD WORKSHOP



UvA HPC Course 2016.06.15

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Agenda

09:30 SURFsara HPC Cloud Introduction (N. Ferreira)

10:15 Hands-on : Parts A & B

12:00 Lunch

13:00 Cloudifying - parallelism & API (A. Astudillo)

13:45 Hands-on : Extras

17:00 End

24th June



“High Performance Computing made easy”

Objective

- Enhance accessibility to HPC facilities
- Set lectures with hands-on workshops
- Develop practical skills

Audience

- Students
- Researchers

Accountability ¹

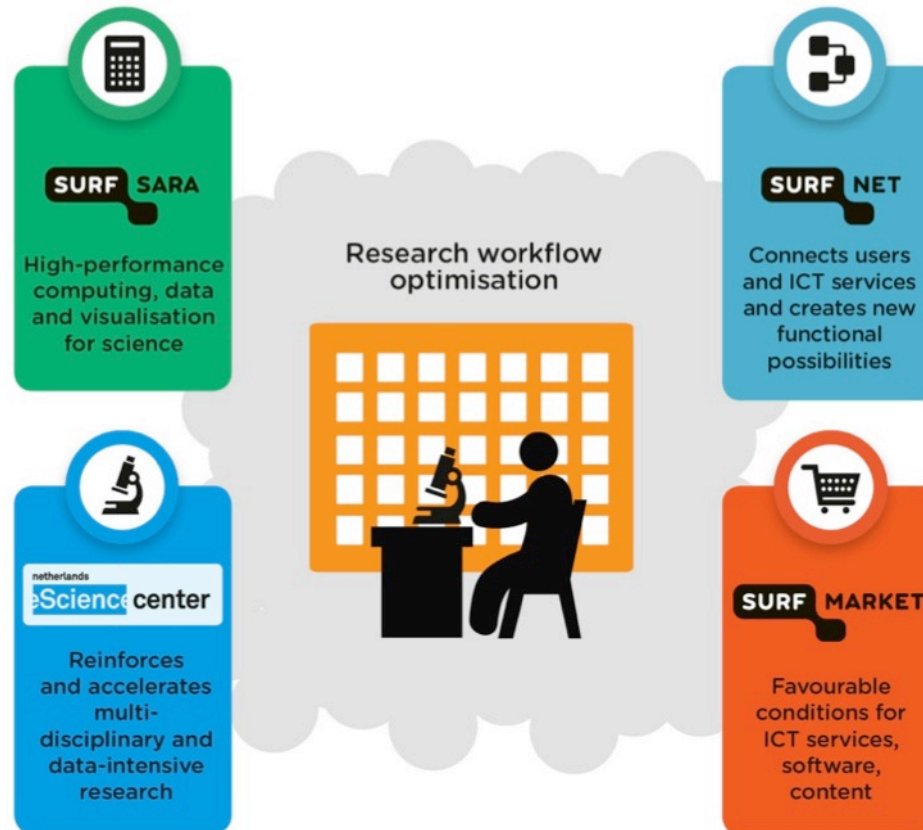
- Bachelor / Master students (6 ECTS)
- Assignments ² : ‘Food for Brain’ questions (afternoon)

¹ [UvA HPC Course](#)

² [Course assignments](#)

Who are We?

About SURF



SURF's mission

SURF **ensures** that students, lecturers, researchers and employees in education and research have **access** to the best possible **ICT resources** on favourable terms for the purpose of top-level research and talent development, including in **national and international collaborative efforts**.¹

Why use national infrastructures?

Scalability, Collaboration, Heterogeneity

What do we (SURFsara) want to offer?

Computing and Data services for research

¹ [SURF Strategic Plan for 2015-2018](#)

SURFsara HQ



Cloud Computing

Is there a definition for Cloud Computing?

“Ask 10 people what the cloud is, get 11 answers.” [?]

Essential Characteristics ^[1]

On-demand self-service, Network access, Resource pooling, Elasticity, Measured

Service Models ^[1]

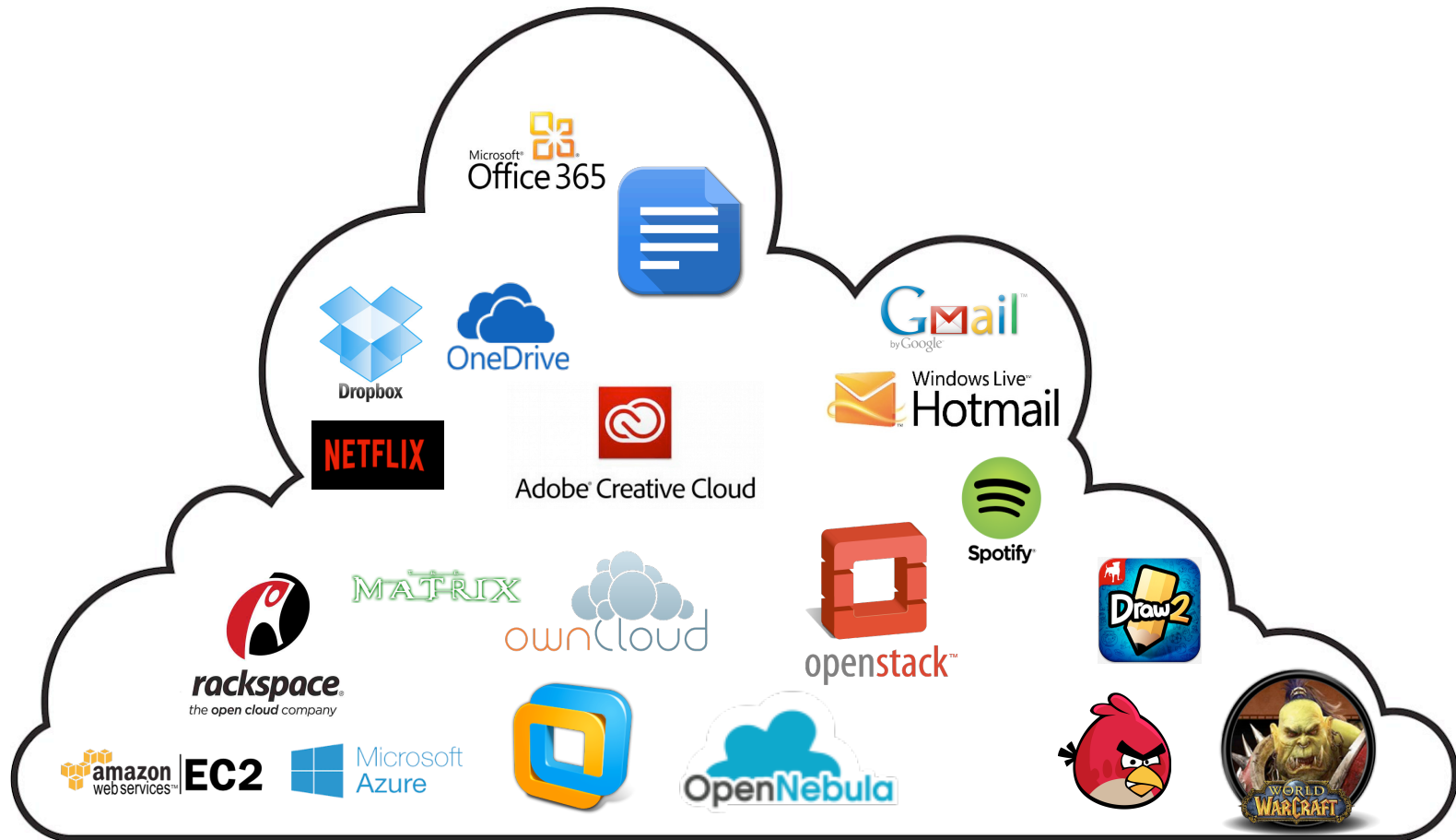
SaaS, PaaS, IaaS

[1]. [The NIST Definition of Cloud Computing](#)

* as a Service



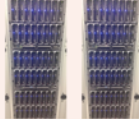


				
SaaS (software)	✓	✓	✓	—
PaaS (platform)	✓	✓	✗	—
IaaS (infrastructure)	✓	✗	✗	—

“Say Cloud one more time ...”

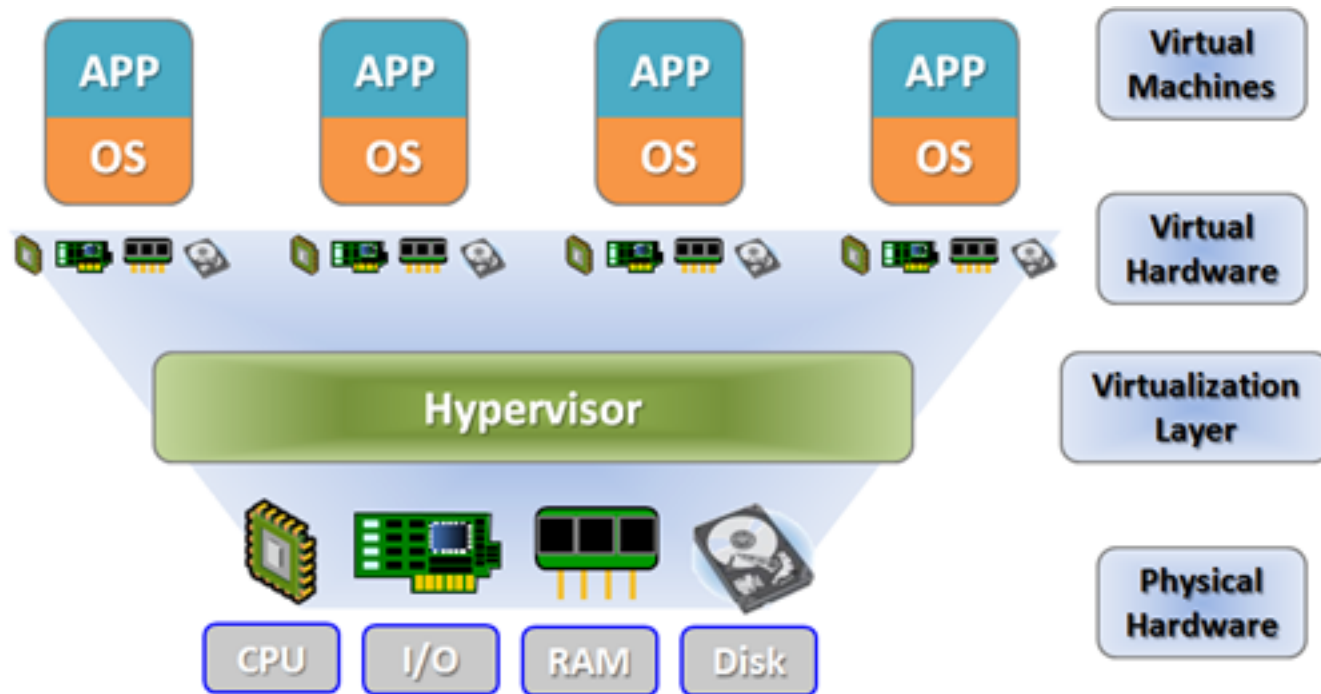


SURFsara HPC Cloud

SURFsara Computing service

	Cartesius	LISA	Grid	HPC Cloud	Hadoop
The machine					
Cores	40,960	7856	5000	2408	1370
Memory	117 TB	26 TB	40 TB	21 TB	4 TB
*aaS	PaaS / SaaS	PaaS / SaaS	PaaS	IaaS	Paas
Unique	<ul style="list-style-type: none"> • GPGPU • Infiniband 	<ul style="list-style-type: none"> • Infiniband • Customizable workspaces 	<ul style="list-style-type: none"> • Scale up to European or worldwide resources • Large local scratch space 	<ul style="list-style-type: none"> • Own OS • GPGPU 	<ul style="list-style-type: none"> • Map/Reduce or Spark driven • Local storage only

Infrastructure as a Service



www.definethecloud.net

Need for an HPC Cloud?

Drawbacks of SURFsara computing components

- Limited access to supercomputer
- Learning curve
- SURFsara maintains OS and SW
- Jobs are queued

Virtualisation Benefits

- Flexibility (install what you want)
- Build private cluster
- External access
- Interaction with running processes



Why HPC Cloud

General benefits

- Data & Computing in Dutch soil
- Data privacy inside your VM
- Unrestricted Internet access (but fair use)

Technical benefits

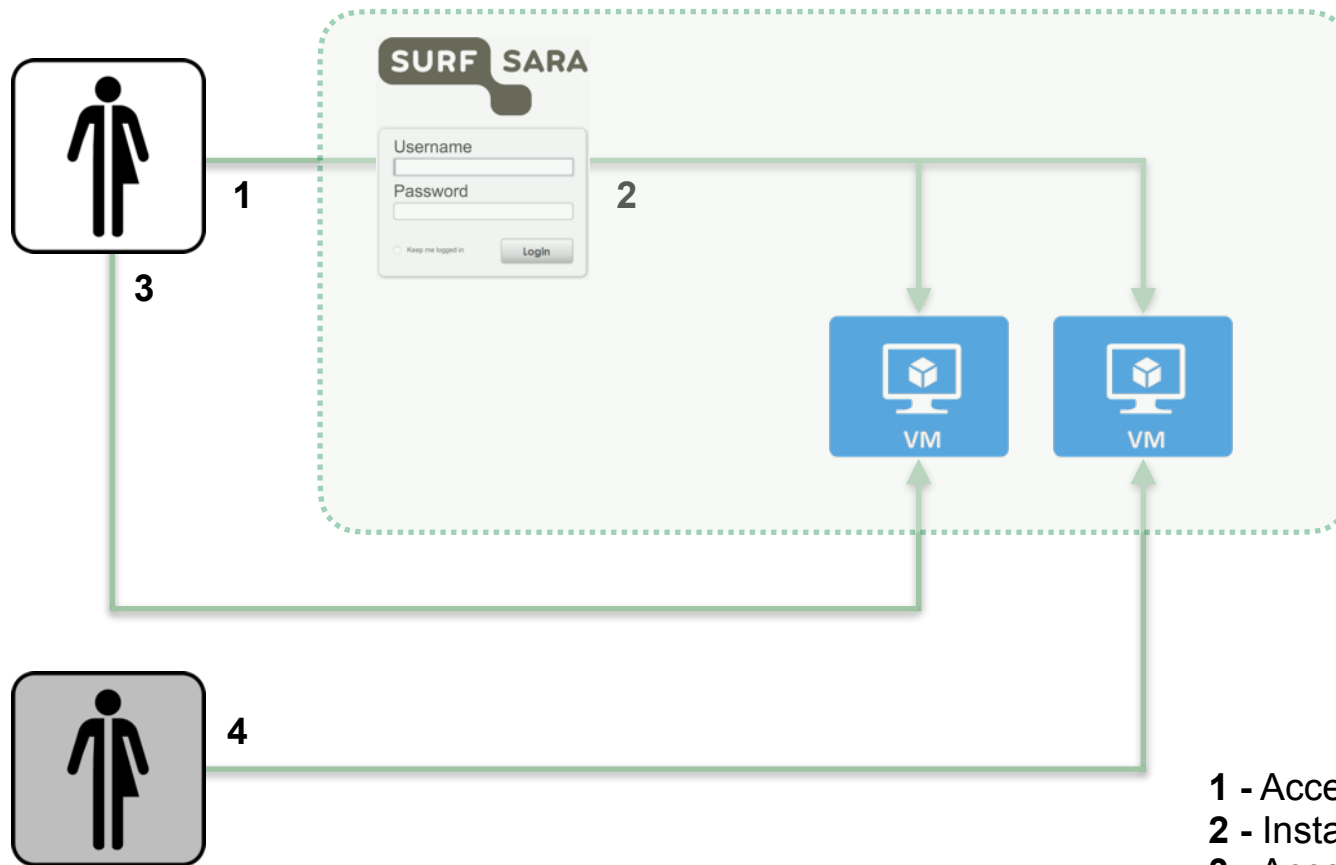
- No overcommitting
- Tailor made your VM to your needs
- Root access!
- Controlled environment : choose your OS & packages
- Fast private network between VM's
- No maximum wall time

Why not HPC Cloud

- No Service Level Agreement
- No 24/7 Helpdesk service support
- You maintain everything in your VM
- You are responsible for all of your VM's behavior
- You must protect yourself against threats from the Internet
- Accounting on VM uptime, not just compute time (like gas, light)
- No automatic backups
- Your laptop is faster than a 1 core VM

From the user perspective

Interacting with the HPC Cloud



- 1 - Access infrastructure (UI)
- 2 - Instantiate VM(s)
- 3 - Access VM
- 4 - Share VM access

How to spin a VM

Creating a VM from scratch can be a lot of work, we provide an “app market”.

Import an appliance:

- CentOS or Ubuntu

Imported OS image:

- copied to node-local SSD
- persistency yes/no (run-time changes copied back or not)

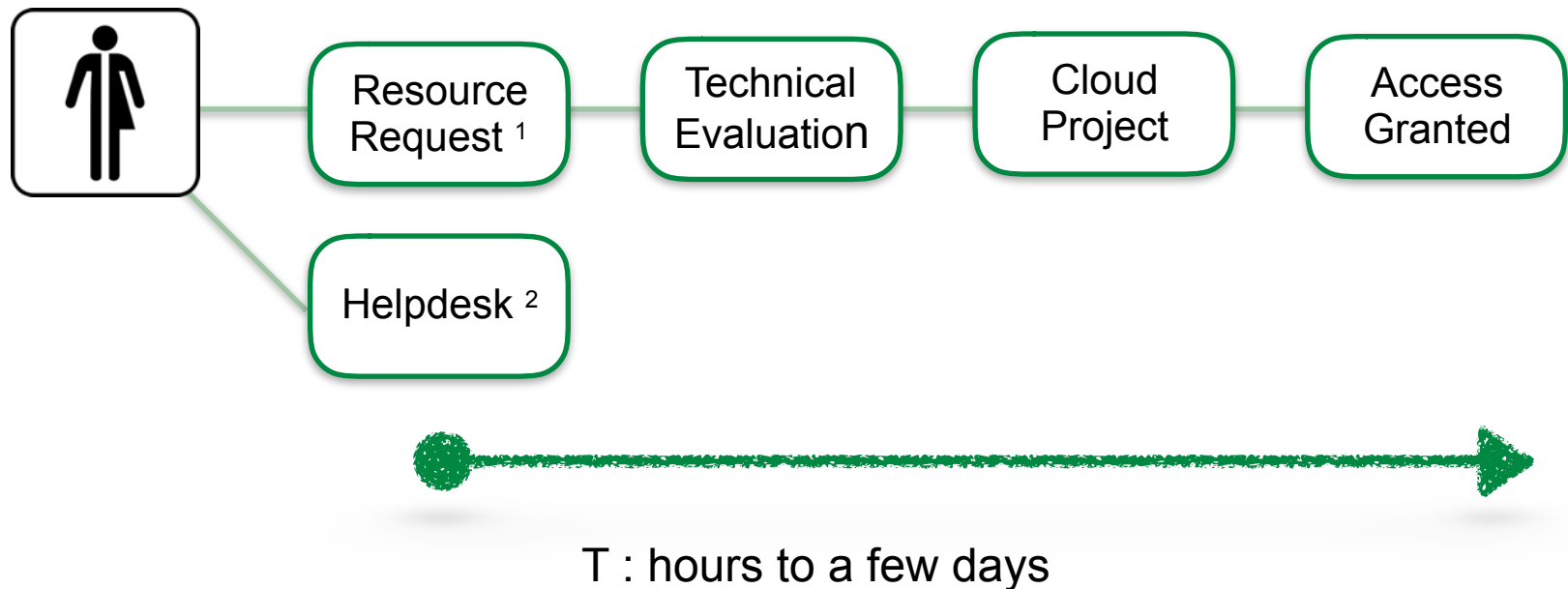
Imported template (VM assembling instructions):

- # cores, RAM, Internet and/or private lan
- additional data images on Ceph storage

Boot the VM and log in with SSH.

Take care of firewalls, security, updates etc., importing an appliance is just a set-up help.

How to obtain an HPC Cloud account?



¹ [Resource Request form](#)

² helpdesk@surfsara.nl

HPC Cloud Resource requests

Number of requests ¹ : 87 (circa 16 / month)

Research fields:

- Biology
- Genetics
- Informatics
- Chemistry
- Ecology
- Linguistics
- Robotics
- Business
- Social sciences
- Engineering
- Humanities

Use cases:

- Flexible software mix
- Big VMs
- Elasticity
- Provide a service to peers
- Software requiring licenses
- Set up, test and deploy workflows
- Training courses
- Intensive computing

¹ Since Jan. 2016

Hands-On

WWW : <https://doc.hpccloud.surfsara.nl/UvA-course-20160615/>

Tips : Work in pairs (each with your credentials on your laptop)
Follow the exercises at your own pace (Parts A&B b4 lunch)

? : Advice as a Service (just call us)

UI : <https://ui.hpccloud.surfsara.nl/>

Username: surfcourseXY

Password: hpc@cloudXY

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